

ment of Science, at the meeting held last week at Clermont Ferrand. From a summary given by the Paris correspondent of the *Times*, we learn that Prof. Appell defines the man of science, not as "the man who knows," but as a man who "combines with his knowledge scientific activity, that is to say, a curiosity always alert, indefatigable patience, and, above all, initiative and again initiative." French instruction, he pointed out, was not generally calculated to develop the latter. The examination system was a trial of memory, not of real knowledge, observation, and experience. The evil extends from the primary schools to the upper special schools, and nothing is more necessary than to begin to oppose this tendency. Prof. Appell's solution would be to utilise universities for scientific education and to substitute for the technical schools, which are now virtually closed to many temperaments that might develop scientific capacities—even a Claude Bernard failed to pass his examination for the medical faculty—open schools in which the selection would take place from among the pupils according to the results of their work for the entire year. He would substitute for the two or three years now passed in the Lycée to prepare for the entrance into the upper special schools a course of scientific training immediately after the close of secondary studies. Prof. Appell developed an elaborate system of re-organisation of the universities involving a complete change in the curriculum of the Sorbonne and in the administration of the Museum of Natural History. He would not, however, in any way alter the character of the Collège de France.

THE Board of Education has issued (Cd. 4184) regulations for the training of teachers for secondary schools. Funds have long been available for the purpose of assisting the training of elementary-school teachers, but there has hitherto been little official recognition of the necessity of making some systematic provision for the professional training of men and women intending to teach in secondary schools. Now, however, a Parliamentary grant of 5000l. has been made available from the Exchequer for this purpose, and the regulations under which the fund will be dispensed are of great interest. The Board has decided that the course of training must be taken after graduation or its equivalent, and be confined to purely professional work. It is to be an indispensable condition for recognition as an efficient training college that there shall be access for the students, under proper conditions, to secondary schools which are thoroughly suitable for demonstration and practice, and not less than one-half of the staff must have been successful teachers for a reasonable time in secondary schools. Grants will be paid to colleges, in which the number of recognised students is not less than ten, at the rate of 100l. in respect of every complete group of five recognised students, subject to the condition that the grant does not exceed one-half of the total sum paid for salaries on account of services in training the students. It is satisfactory to find so complete an appreciation of the imperative need that the staff responsible for the training of secondary-school teachers must possess high academic qualifications, and be, in addition, experienced and successful teachers. There has been in the past an uneasy feeling that much of the training available for secondary-school teachers was divorced too completely from schoolroom practice and over much concerned with theoretical and historical matters, and these regulations of the Board of Education will serve to inspire greater confidence in the value of the training provided in assisted colleges.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 28.—"On the Theory of Capillarity." By Dr. E. T. Whittaker, F.R.S.

The fundamental quantities in the theory of capillary phenomena are the *surface-tension* γ (expressed, say, in dynes per centimetre), and the *surface-energy* λ (expressed in ergs per square centimetre). The relation between these two quantities is at once given by the thermodynamic

equation connecting available energy with total energy; it is therefore

$$\gamma = \lambda + T \frac{d\gamma}{dT}, \dots \dots \dots (1)$$

where T denotes absolute temperature.

This equation implies that when the area of a surface of separation is increased by 1 cm.² at temperature T , the external agencies do work amounting to γ ergs against the surface-tension: and this energy, together with a further contribution of $-T d\gamma/dT$ ergs which is appropriated from the heat-energy of neighbouring bodies, becomes resident in the film, giving rise to an increase of λ ergs in its internal energy.

The relation between the surface-tension and surface-energy is, of course, exactly the same as the relation between the electromotive force of a voltaic cell and the energy of the chemical reactions which occur in the cell.

The author has deduced the values of λ which correspond to Ramsay and Shield's experimental values for γ , and shows that they satisfy a relation which may be stated as follows:—*The surface-energy λ of a liquid in contact with its own vapour at any temperature is proportional to the product of the internal latent heat and the (absolute) temperature.*

The internal latent heat is intimately connected with Laplace's "intrinsic pressure" K of a liquid, and so with the classical theory of capillary phenomena.

PARIS.

Academy of Sciences, August 3.—M. Bouquet de la Grye in the chair.—A problem relating to the theory of orthogonal systems and the method of the mobile trihedron: Gaston Darboux.—Contribution to the dynamical study of motors: A. Witz. If, when the motor has arrived at a state of steady motion, the motive power is instantaneously cut off, the moving parts make a certain number of revolutions with a decreasing velocity. From a study of this decreasing velocity important conclusions concerning the effects of friction can be obtained. The application of this method to a gas engine, working a dynamo, gave an efficiency of 79 per cent., as against 78.4 per cent. obtained by using the dynamo as the motor. For smaller gas engines the results were less satisfactory.—The families of Lamé composed of equal surfaces: J. Haag.—The tendency of material systems to escape friction: Georges Rémondos.—Detectors for use in wireless telegraphy with points of tellurium and tellurides: Edouard Branly. The tripod detectors with points of tellurium or tellurides acting on polished steel belong to the group of radio-conductors working by variations of resistance, and require an external electromotive force for their working. The thermoelectric detectors of M. Tissot belong to a different class.—The conditions and duration of the auto-excitation of dynamos: M. Swyngedauw.—The electric arc between a solid electrode and a liquid: G. Athanasiadis. Duddell's experiment may succeed when the arc is produced between a liquid anode and a solid cathode. The arc formed between an electrolyte and a solid electrode as the cathode may be produced even with an immersion of 7 cm. or more, the difference of potential being 220 volts, and in certain cases this arc may give rise to the effects of the Wehnelt interrupter, although with reduced intensity. It is impossible to produce an arc between a solid anode and an electrolyte even with a voltage of 220 volts.—The quantitative indications furnished by dissociation spectra: silver: A. de Gramont. The number and intensity of the silver lines, obtained in the dissociation spectra of mineral conductors, bear a direct and constant relation with the proportion of the metals in the specimens. Details are given of the lines for various minerals and alloys containing from 1 per cent. to 0.0001 per cent. of silver, and application is made of the method to the study of argentiferous galena.—A new method of preparing pure hydrogen: M. Mauriceau-Beaupré. Aluminium foil is treated with a small quantity of mercuric chloride and powdered potassium cyanide. In contact with water this material gives 1300 c.c. of pure hydrogen per gram. Advantages are claimed for this material in aeronautics.—The realisation *in vivo* and *in vitro* of precipitins for ovalbumen: André Mayer and Georges Schæffer.

A precipitin has been obtained for ovalbumen by injecting certain fatty acids or their esters in the rabbit; this material possesses all the properties of that obtained by injecting the rabbit with ovalbumen.—The maturation of the egg and cytodiaeresis of the blastomeres of *Paravortex candii*: Paul **Hallex**.—Composition of the strata transported from the Peloponnesus to Mt. Ithoma: P. **Négris**.—The first twilight of the morning and the second evening twilight: E. **Durand-Gréville**. This phenomenon appears to be general, and is not peculiar to mountain districts, and hence an explanation cannot be sought in the cooling of the air in the mountain valleys.

NEW SOUTH WALES.

Linnean Society, June 24.—Mr. A. H. S. Lucas, president, in the chair.—A catalogue of the Hemiptera of Fiji: G. W. **Kirkaldy**. The previous total of Fijian Hemiptera was about forty. This is brought up to 202 (of which seven have not been specifically determined), including the representatives of ten genera, one subgenus, and forty-two species described as new. But the endemic forms were scarcely yet collected, as only three islands had been searched for Hemiptera, viz. Viti Levu, the largest island and the seat of the present capital; Ovalau, a small island, the former seat of government; and Taviuni, an island to the east of Vanua Levu. The whole archipelago must be exceedingly rich in Hemiptera, and probably less than a tenth of the total of that fauna is known.—Revision of the genus *Seirottrana* (Coleoptera: fam. Tenebrionidae), together with descriptions of new species of other Australian Coleoptera: H. J. **Carter**.—The new genus *Austrogynacantha* (Neuroptera: Odonata): R. J. **Tillyard**.

CALCUTTA.

Asiatic Society of Bengal, July 1.—Proposals for a standard temperature for use in tropical countries: Paul **Brühl**. Specific gravity and other tables constructed for normal temperatures of 62° F. or 15° or 20° C. do not, as a rule, serve the purposes of the chemist and physicist who work in the tropics, and the spread of science in tropical countries will render the choice of one or two standard temperatures specially adapted to the tropics a matter of necessity. The author's observations lead him to the conclusion that the most convenient standard temperature for Calcutta is 30° C. at least during the period extending from the beginning of March until the middle of November. During the remaining part of the year 22° C. would be more useful as a standard temperature. Tables of the specific gravity of sulphuric acid at 25°, 30°, and 35° C. have been worked out.—Recent plant immigrants: Paul **Brühl**. A considerable number of phanerogamic species have found their way into Bengal during the last hundred years, and have become practically endemic. Some of them belong to the most common weeds found on road-sides and waste-places. One of the most recent immigrants is a species of *Croton*, which was first identified with *Croton sparsiflorus*, Morung, by Colonel Prain, who discovered the plant in the Sunderbuns. A detailed description of the plant is given; its present distribution is traced as far as possible. A list of those species is added which appear to have immigrated into Bengal during the last century.—Geological notes on Hill Tipperah (including the Lalmai range in Comillah district): Hem Chandra **Das Gupta**. This paper gives a sketch of the geology of a district about which little is known, except that the rocks are all of Tertiary age. The account of the tract called "pyaro land" is interesting, as it directs attention to a phenomenon not easily to be accounted for. It may be an area of local subsidence, set in motion by the earthquakes that have been so numerous in eastern Bengal during the past few years.—Drosometric experiments and observations: Paul **Brühl** and Bepin Behari **Das**. The fact that a great number of plants growing in Bengal continue to flourish during the drier seasons of the year, notwithstanding the absence of rainfall during several months, points to the dew playing an important part in Bengal plant life. The authors have, therefore, during the last three years, made a number of observations on the condensation of dew from the end of one

rainy season to the beginning of the next. For this purpose they have constructed a dew-recording instrument, which is described. A selection of the curves obtained is added.—The surgical instruments of the Hindus, with a comparative study of surgical instruments of the Greek, Roman, Arab, and modern European surgeons. Part ii., Blunt instruments: Dr. Girindra Nath **Mukerjee**. The author describes at length the blunt surgical instruments mentioned by Susruta and other writers, and compares them with instruments known to the Greeks.—Observations on the intensity of daylight illumination in Lower Bengal: Paul **Brühl** and Bepin Behari **Das**.—The most complete set of observations on daylight illumination is that made by Prof. Leonhard Weber and his coadjutors in the Physical Institute of the University of Kiel. Some observations have also been made in the tropics, especially by Wiener in Java. The authors have collected corresponding data in the Physical Laboratory of the Engineering College, Sibpur, using a Weber's photometer as the observing instrument and a large screen of plaster of Paris for the illuminated surface. The results have been tabulated.—Reduction of Fehling's solution to metallic copper—a method of depositing a shining, mirror-like film of copper on glass vessels: Panchanan **Neogi**.

CONTENTS.

	PAGE
Geological Explorations in Sinai. By H. B. W.	337
A Treatise on Aërial Flight	337
Spectroscopy	338
Popular Ornithology	339
Our Book Shelf:—	
"Handbook of Learned Societies and Institutions—	
America."—H. M.	340
Halácsy: "Supplementum Conspectus Floræ	
Græcæ."—Dr. Otto Stapf, F.R.S.	341
Linck: "Grundriss der Kristallographie für Studier-	
ende und zum Selbstunterricht."—G. F. H. S.	341
Gwinnell: "A Hill Country: its Physical Features	
and their Significance	341
Letters to the Editor:—	
On the Antiquity of Mummification in Egypt—A	
Correction.—Prof. G. Elliot Smith, F.R.S.	342
The Mechanics of the Inner Ear.—Dr. Max Meyer ;	
Prof. John G. Kendrick, F.R.S.	342
Elementary Organic Chemistry.—Dr. J. F. Thorpe,	
F.R.S.	342
Space and Number.—Ottavio Zanotti Bianco	342
The Grouse-Disease Report. By R. L.	343
The International Geographical Congress at	
Geneva. By Major C. F. Close	344
Mammoth-Hunting in Alaska. (Illustrated.)	346
Alphonse Péron	346
Notes	347
Our Astronomical Column:—	
Sun-spots Visible to the Naked Eye. (Illustrated.)	351
A Brilliant Fireball	351
The Large Meteor of June 28	351
Observations of Encke's Comet	351
A Variable Star of Remarkably Short Period	351
Economic Geology in the United States. (Illustrated.)	352
The Synchronisation of Clocks	353
Education at the Franco-British Exhibition. By	
G. F. Daniell	354
The Electrochemistry of Light. By C. J.	356
Barometric Gradient and Wind Force	357
The Work of the Physikalisch-Technische	
Reichsanstalt in 1907	358
Universitv and Educational Intelligence	358
Societies and Academies	359